

The limitation of the canalicular tissue of the cord, at its placental attachment, is quite as abrupt.

The injection-fluid cannot be made to pass from the substance of the cord into the placenta, for it is arrested by a firm membrane derived from the chorion, which the vessels of the cord penetrate, and between two layers of which they lie. There is absolutely no connexion between the nutritive system of the cord and that of the placenta.

VI. The chief factor in the nutrition of the cord is the arrangement of capillaries entering it from the foetus. From the facts observed by me in cases of extra-uterine gestation, it is likely, however, that the stomata of the epithelial surfaces of the cord play an important part in its nutrition.

The liquor amnii contains substances which are very suggestive that the fluid is used for purposes of nutrition, and perhaps for the nutrition of the cord. In recent cases of extra-uterine foetation, before the liquor amnii becomes absorbed, the cord remains fresh and plump. After the fluid has been absorbed the cord becomes shrivelled; but it still retains its structural characters, minus the wandering cells. It may be, therefore, that the canalicular nuclei are able to keep the cord in repair, as it were, by the matters absorbed from the liquor amnii, until that fluid disappears—very much as ivy continues to live after its connexion with its root has been severed. Indeed the analogy between the umbilical cord and vegetable tissue is, as I hope to be able to show further, a very close one.

III. "First Report of the Naturalist accompanying the Transit-of-Venus Expedition to Kerguelen's Island in 1874." (Conclusion.) By the Rev. A. E. EATON. Communicated by the PRESIDENT. Received May 10, 1875.

In January 1875, shortly after the departure of the American Expedition from Royal Sound, an opportunity occurred of visiting another part of Kerguelen's Island. To relieve the ennui of his officers and men, who by that time were thoroughly tired of being detained without any definite occupation in an uninhabited island, Captain Fairfax ordered the 'Volage' to leave Observatory Bay, and proceeded to Swain's Bay, where he remained three weeks. During this period he entertained me as his guest, took me to the best localities in the bay for collecting, and rendered me every assistance that lay in his power. The Royal Society is therefore indebted to Captain Fairfax for a fine series of Algæ from Swain's Bay, comprising many species not found in Observatory Bay, and some that were not known to be indigenous to the island. Most of these are described in the 'Flora Antarctica' as Falkland-Islands species. Captain Fairfax at the same time enabled me to secure the skeleton of a *Globocephalus*, which was found dead in shallow water by Mr. Forrest (Mids.). Most of the epidermis had been removed by small

crustacea, so that it was not possible to ascertain the colour of the animal ; but Lieut. Goodridge, R.N., very kindly photographed the carcass before it was flensed, and its dimensions were carefully taken by one of the boat's crew, and therefore it will be easily identified.

Young Sea-Elephants were frequently found by us in Swain's Bay. Some examples are uniformly reddish brown, others are pale, blotched and spotted with darker grey. They usually lie just above the beach, separately, in hollows among the *Accena* and *Azorella*, where they are sheltered from the wind. On being approached they make no attempt to move away (possibly because there are no land animals indigenous to the country capable of molesting them to cause them to acquire a habit of flight), but raise up the fore part of their body, open the mouth wide, and utter a peculiar slobbering cry. My mammalian specimens, unfortunately, are not so complete as they were when first procured, owing to the impossibility of preventing "liberty men" and others taking an interest in such "great curiosities" whilst the process of cleaning them was in progress. The removal of stones, purposely laid upon some of the bones, led to the loss of the fore limbs of seals, &c., which were blown away by the wind.

All of the birds, with the exception of two species (a *Procellaria* and a *Thalassidroma*), are represented in the Cape-Town Museum.

Thalassidroma Wilsoni (Dr. Wyville Thomson, however, seems to consider the Kerguelen-Island bird to be another species) arrived in the Sound in great numbers a few days before the "Transit." Towards the end of January they commenced laying their eggs generally. By the second and third weeks of February the incubation of the eggs was usually far advanced ; and a day or two before we left the island, Capt. Fairfax sent me a young bird recently hatched. The tarso-metatarsal joint is not elongated in the chick. I failed to find the eggs of *Thalassidroma melanogaster* ; the birds occurred to me only in pairs.

It may be well to explain that Petrels sit in their holes in pairs until the egg is laid. Then usually only one bird is found at a time upon the nest until the young are hatched ; and soon after they have issued from the egg the young are found alone during the day. For whilst incubation is in progress, the bird not upon the nest is either asleep in a siding or branch of the burrow or (more commonly) is spending the day at sea ; and when the young are a day or two old, both of the parents absent themselves during the day, and only return at night for the purpose of feeding them.

Along the coast, outside Swain's Bay, a few examples of *Diomedea melanophrys*, a species not observed in Royal Sound, were noticed.

In the less frequented parts of the island some of the birds were unusually fearless and tame. Shags would submit to be stroked along the back without getting off their nests or attempting to peck the hand. More than once Sheathbills, and on one occasion a Skua, fed out

of my hand. A Sheathbill, after pecking at my boots, ate in succession six eggs held out to it. But the Skua behaved in a still more extraordinary manner. On approaching within three hundred yards of the nest it was evident, from the excitement of the old birds, that the young were hatched; and on searching for the nestlings, the old birds commenced their usual onslaught when within two hundred yards of the nest. Disregarding their outcries and fierce swooping down, I soon found the young ones crouching amongst the herbage some distance apart from one another and the nest (which they leave at an early age), and sat beside the nearest. The hen Skua immediately alighted within a yard of me and continued her vociferations, whilst the cock withdrew to the other nestling. On stroking her chick the hen became more excited than ever and advanced a little nearer. Taking a Prion's egg from my pocket and holding it out, her cries ceased whilst she eyed the egg, but recommenced when she again looked at me. She once more looked at the egg, became silent, waddled cautiously up and pecked gently at my finger, then, reassured, pecked the egg, which she very soon made an end of. In the same way she ate a young Prion killed for the purpose, and afterwards flew to the hole from whence the bird had been taken to see if it contained another; and upon my digging at some other holes, she came near and stood by in eager expectancy of further gratuities. With regard to her pecking first at the finger before the egg, I would observe that wild birds usually do this previous to feeding out of the hand. The Sheathbills did the same, and so do English birds which have never been in confinement. It seems to be their way of testing the nature of any strange-looking object.

The Sheathbill was plentiful in Swain's Bay, and a fair number of their eggs were procured. As Dr. Kidder, the American Naturalist, had not succeeded in finding any, I was anxious that he should have some; but did not consider myself at liberty to give him more than one, and that a damaged specimen almost in halves. The Royal Society will now be able to be more liberal.

A fine male example of a *Raia*, differing from the species previously found in Royal Sound, was shot by Mr. Budds, the chaplain of H.M.S. 'Volage,' two days before we sailed.

The *Agrostis* mentioned when I last wrote came into flower about the third week in January. It can scarcely be said to form a sward, or pasturage even, in the neighbourhoods visited by me. The *Limosella* was found in February in fruit and flower, very sparingly, in only one shallow lake between the Observatory and Mount Crozier.

I omitted to inform you that the Kerguelen-Island *Callitriche*, given in the 'Flora Antarctica' as *C. verna* var. *terrestris*, should (I think) be regarded as a form of *C. pedunculata* rather than of *C. verna*. It has no bracts, and seems to exhibit other peculiarities of *C. pedunculata*. Prof. Wyville Thomson alludes to it as *C. verna*; but probably he

adopted the name from the 'Flora' without suspicion, unless, indeed (which is unlikely), both species occur on the island. For the satisfaction of other botanists I have brought back specimens of the plants in spirits, showing flower and fruit, as well as dried examples.

The fern, which was new to me, according to Lady Barkly, may be a form of *Polypodium (Grammitis) australe*.

In the following particulars I am sorry to have occasion to report failure.

The moss-eating Lepidopterous larvæ all died before our arrival at the Cape.

All the larger Algæ collected were spoilt. One suite of dried examples was lost, through the box in which they were contained being placed open, in the rain, by one of the servants a few days before we sailed, without my knowing it had been moved from its place. The second set, gathered the day before we left the island, was sent on board the 'Supply,' with directions that the box should be placed in an accessible position: unfortunately the message miscarried, the box was stowed away in the hold, and I could not get at it until a fortnight afterwards, when almost the whole of its contents were completely decomposed.

Again, series of examples of some of the flowering plants were lost through the difficulty of attending to them when collected.

I left Kerguelen's Island in H.M.S. 'Supply' on the 27th February, arrived at Simon's Bay on the 31st March, and at Gravesend on the evening of the 7th May. In the course of the voyage I collected a few animals and Algæ with the towing-net.

IV. "On the Determination of Verdet's Constant in Absolute Units." By J. E. H. GORDON, B.A., Gonville and Caius College, Cambridge*. Communicated by Professor J. CLERK MAXWELL, F.R.S. Received May 5, 1875.

(Abstract.)

In the year 1845 Faraday discovered that certain media possess the property of rotating the plane of polarization of light passing through them when a magnetic force acts on them. About the year 1853 M. Verdet found that with the same magnet and medium the rotation is directly proportional to the strength of the magnet—that is, that the ratio between the amount of rotation and the intensity of the magnetic field is constant.

The object of this investigation is to measure this constant in absolute

* The whole of this work has been done under Prof. Clerk Maxwell's superintendence. He suggested the method and nearly all the details; and any merit which the investigation may have belongs to him. He is, however, in no way responsible for any errors there may be in the numerical results.